 **CHAPTER 3. DISCIPLINES OF HCI**

## Overview

HCI understands the Complex Relationship between Human and Computers, which are two distinct ‘Species’. Successful Integration is dependent upon a better understanding of both Species. Hence HCI borrows and establishes its roots in Disciplines concerned with both.

## Learning Objectives

At the end of this chapter, the students should be able to:

* Discuss the different disciplines involved in HCI; and
* Interconnect the disciplinary nature of HCI

## Topics

3.1. Human Computer Interaction (HCI)

3.2. Interdisciplinary nature of HCI

Human-related

Computer-related

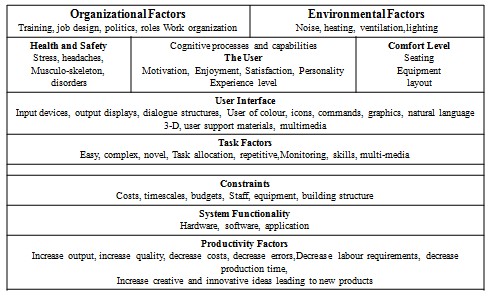
## Learning Contents

**3.1. What is HCI?**

* HCI is a large interdisciplinary area
* Emerging as specialty concern within several disciplines, each with different emphases
  + Computer science (*application design and engineering of human interfaces)*
  + Psychology (*the application of theories of cognitive processes and the empirical analysis of user behavior*)
  + Sociology and anthropology (*interactions between technology, work, and*
  + *organization*)
  + Industrial design (*interactive products*)

* HCI concerned with:
  + Joint performance of tasks by humans and machines
  + Structure of communication between human and machine
  + Human capabilities to use machines
  + Algorithms and programming of interfaces
  + Engineering concerns in designing and building interfaces
  + Process of design, specification and implementation
  + Design trade-offs

* Various aspects
  + Science (Human capabilities to use machines)
  + Engineering (Building interfaces)
  + Design (Design tradeoffs)



### 3.2. Interdisciplinary Nature of HCI

* HCI is understanding the Complex Relationship between Human and Computers
* Two Distinct “Species”
* Successful Integration is dependent upon the a better understanding of both Species
* Hence, HCI borrows and establishes its roots in Disciplines concerned with both:
  + HCI has roots in many disciplines
  + HCI is inter-disciplinary in nature

|  |  |  |
| --- | --- | --- |
| HCI | Cognitive  Psychology | Social  Organizational |
| Psychology | Linguistics |
| Ergonomics and Human Factors | Anthropology |
| Philosophy | Computer Science |
| Artificial Intelligence | Engineering |

Design

### Interdisciplinary Nature of HCI – Human Side

* Cognitive Psychology
* Social Organizational Psychology
* Ergonomics and Human Factors
* Linguistics
* Philosophy
* Sociology
* Anthropology

#### Cognitive Psychology

* Understanding human behavior and mental processes
* Human information processing: See, Feel, Touch, Smell, and Taste
* How much information can be processed and remembered

#### Social Organizational Psychology

* Studying nature and causes of human behavior in social context
* Four core concerns:
  1. Influence of one individual on another person’s attitude and behavior
  2. Impact of a group on its member’s attitude and behavior
  3. Impact of a member on group’s activities and structure
  4. Relationship between the structure and activities of different groups
* Informs designers how computers affect working practices

#### Ergonomics or Human Factors

* To define and design tools and various artifacts for different work, leisure and domestic environment to suit the capacities and capabilities of users
* Ergonomist translates the above information from the above mentioned sciences into context of design of products
* Increase feelings of comfort and satisfaction
* Concerns
* Hardware design
* Radiation from VDUs
* Repetitive Strain Injury (RPI)

#### Linguistics

* Scientific study of languages
* Command-object (delete ‘report’ OR ‘report’ delete)
* Understanding structure (syntax) and meaning (semantics)
* HCI goal is to develop natural language interfaces

#### Philosophy, Sociology and Anthropology

* Contribution in the sense of Soft Sciences for HCI
* Considers introduction of IT in society
* Ethnography involves observing people
* Cognitive psychology tries to predict
* Computer Supported Cooperative Writing

### Interdisciplinary Nature of HCI – Computer Side

* Computer Science
* Artificial Intelligence
* Engineering
* Design

#### Computer Science

* Provides knowledge about capability of technology
* Developing techniques to support software design, development and maintenance

#### Artificial Intelligence

• Intelligent Computing concerned with simulating human behavior • HCI – development of expert and tutoring systems

#### Engineering

• Engineering takes finding of sciences and utilizes them in the production of artifacts.

#### Design

• Design contributes creative skills and knowledge to this process.

To summarize the main topics that make up the discipline of HCI. All HCI takes place within a social and organizational context. Different kinds of applications are required for different purposes and care is needed to divide tasks between humans and machines, making sure that those activities and routine are allocated to machines. Knowledge of human psychological and physiological abilities and, more important still their limitations is important.

This involves knowing about such things as human information processing, language, communication, interaction and ergonomics. Similarly it is essential to know about the range of possibilities offered by computer hardware and software so that knowledge about humans can be mapped on to the technology appropriately. The main issues for consideration on the technology side involve input techniques, dialogue technique, dialogue genre or style, computer graphics and dialogue architecture. This knowledge has to be brought together somehow into the design and development of computer systems with good HCI. Tools and techniques are needed to realize systems. Evolution also plays an important role in this process by enabling designers to check that their ideas really are what users